PIONEER ACRES (PWS 6060056)
SOURCE WATER ASSESSMENT FINAL REPORT

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State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for Pioneer Acres, in Bingham County, Idaho* describes the water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk, and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

Final susceptibility scores are derived from equally weighted system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories, coupled with a higher rating in another category, results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories: inorganic chemical (IOC, i.e., nitrates, arsenic) contaminants, volatile organic chemical (VOC, i.e., petroleum products) contaminants, synthetic organic chemical (SOC, i.e., pesticides) contaminants, and microbial contaminants (i.e., bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

Pioneer Acres (PWS# 6060056) is a community drinking water system that currently consists of two well sources: Well #1 and Well #2. The wells provide water for a subdivision located south of Moreland and is approximately six miles west of Blackfoot. Water from the wells is pumped directly into the distribution system. The PWS serves approximately 150 persons through 29 unmetered connections.

The potential contaminant sources identified within the delineated time-of-travel (TOT) zones include major transportation corridors (U.S. Route 26, the railroad), a major surface water source (People's Canal) and network of irrigation canals. Other possible contaminant sources were underground storage tank (UST) and leaking underground storage tank (LUST) sites. There were sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resource Conservation Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Release Inventory (TRI). Dairies are located within the delineation along with deep injection wells, landfills, a wastewater land application site, and mines/quarries. In addition, local businesses were included that have the potential to contaminate due to the nature or type of the business.

For the assessment, a review of laboratory tests for Pioneer Acres was conducted. During the water system's history (July 1996 to September 2002), total coliform bacteria were detected twelve times at various locations within the distribution system, two of which were detected at the wellhouse (September 1997). Since September 2000, no total coliform bacteria have been detected in the system. No SOCs or VOCs have been detected in the water samples taken at the sample tap for the wells. However, there have been IOCs and radionuclides (RADs, i.e., gross alpha, gross beta) detected. The IOCs detected were barium, cyanide, fluoride, mercury and nitrate. All chemical results for the wells did not meet or exceed the maximum contaminant level (MCL) as established by the EPA for each chemical.

The Idaho Department of Environmental Quality (DEQ) in 2000 conducted a sanitary survey for the Pioneer Acres. The survey provides a system overview and lists improvements that should be made by the water system to ensure compliance with DEQ regulations (IDAPA 58.01.08). Improvements to be made include installation of approved casing vents on Well #1 and Well #2.

The capture zones for the wells intersect a priority area for the SOC atrazine. The organic priority areas are areas where more than 25% of the wells show levels greater than 1% of the primary standard or other health standards. Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

The susceptibility ratings for the Pioneer Acres drinking water system were based upon available information relating to soil drainage characteristics, agricultural land use, system construction, and potential contaminant sources identified within each well's zone of contribution. The final susceptibility ranking for Well #1 and Well #2 were high for IOCs, VOCs, SOCs and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the Pioneer Acres, drinking water protection activities should focus on keeping the system in compliance as outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). There should be no application or storage of herbicides, pesticides, or other chemicals within 50 feet of a public water system well. The system should continue their efforts to keep the distribution system free of microbial contamination. Any new sources that could be considered potential contaminants that reside within a well's zone of contribution should be investigated and monitored to evaluate the threat of contamination the source may pose in the future. Land uses within most of the source water assessment area are outside the land ownership boundaries of Pioneer Acres. Therefore partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating staff and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil and Water Conversation District. Since a major transportation corridor (i.e., U.S. Route 26) intersects the delineation, the Idaho Department of Transportation should be involved in protection efforts. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR
PIONEER ACRES, BINGHAM COUNTY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

Background

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water system for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

Level of Accuracy and Purpose of the Assessment

Since there are over 2,900 public water sources in Idaho, there is limited time and resources to accomplish the assessments. All assessments must be completed by May of 2003. An in-depth, site-specific investigation of each significant potential source of contamination is not possible. **Therefore, this assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk, and they should not be used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The information necessary to develop a drinking water protection program should be determined by the local community and be based upon its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Pioneer Acres (PWS# 6060056) is a community drinking water system that currently has two well sources: Well #1 and Well #2. The wells provide water for a subdivision located south of Moreland and is approximately six miles west of Blackfoot (see Figure 1). Water from the wells is pumped directly into the distribution system. The PWS serves approximately 150 persons through 29 unmetered connections.

For the assessment, a review of laboratory tests for Pioneer Acres was conducted. During the water system's history (July 1996 to September 2002), total coliform bacteria were detected twelve times at various locations within the distribution system, two of which were detected at the wellhouse (September 1997). Since September 2000, no total coliform bacteria have been detected in the system. No synthetic organic chemicals (SOCs, i.e., pesticides) or volatile organic chemicals (VOCs, i.e., petroleum products) have been detected in the water samples taken at the sample tap for the wells. However, there have been inorganic chemicals (IOCs, i.e., nitrate) and radionuclides (RADs, i.e., gross alpha, gross beta) detected. The IOCs detected were barium, cyanide, fluoride, mercury and nitrate. All chemical results for the wells did not meet or exceed the maximum contaminant level (MCL) as established by the EPA for each chemical.

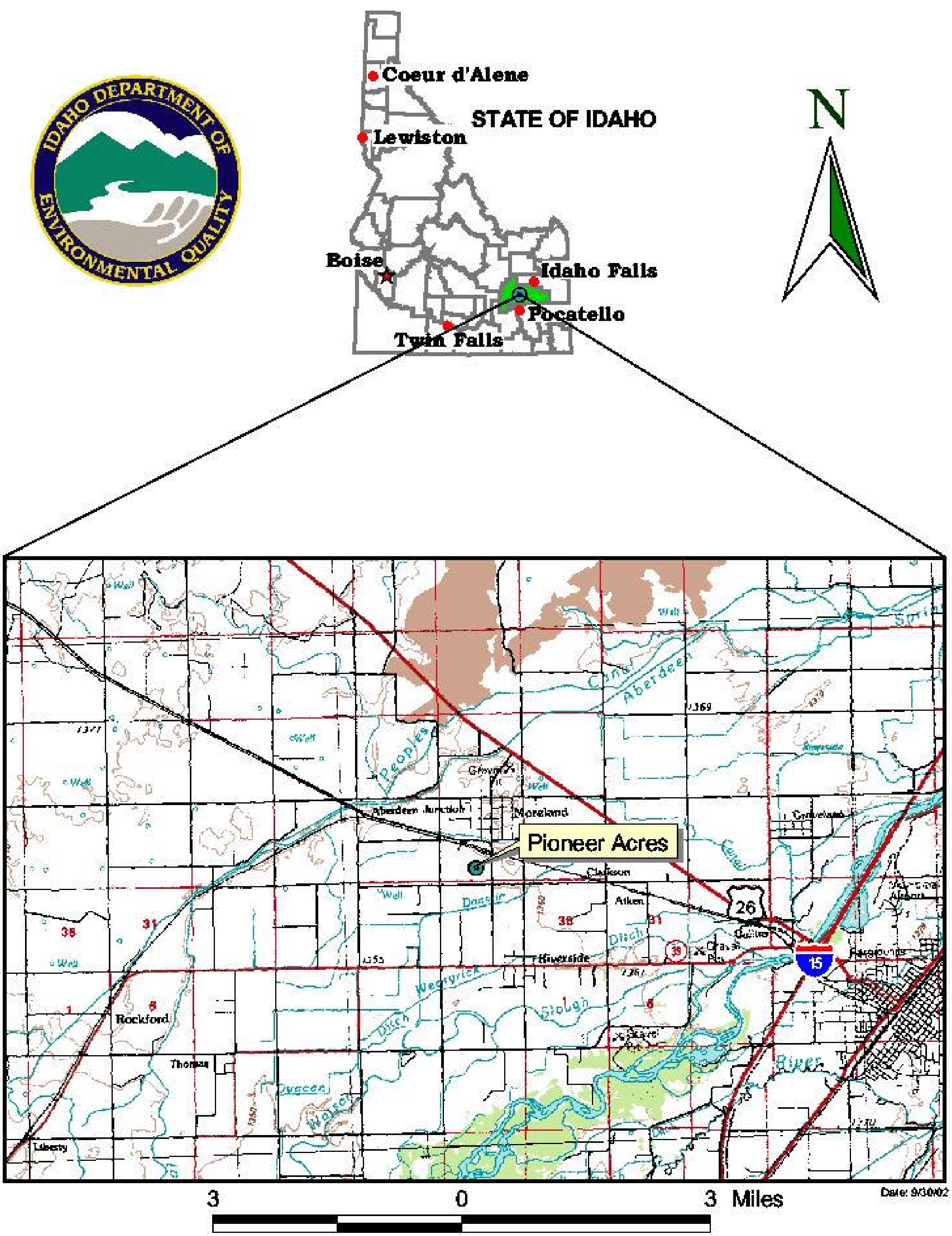
The nitrate history (between the years of 1981 and 2002) for the wells show that all samples taken were below the MCL of 10.0 milligrams per liter (mg/L). Nitrate concentrations for range from 1.1 mg/L to 2.58 mg/L with the peak concentration in December 1993.

The capture zones for the wells intersect a priority area for the SOC atrazine. The organic priority areas are areas where greater than 25% of the wells show levels greater than 1% of the primary standard or other health standards. Atrazine is a widely used herbicide for control of broadleaf and grassy weeds.

Defining the Zones of Contribution--Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the PWS's zones of contribution. WGI used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) Time-of-Travel (TOT) for water associated with the East Margin Area of the Eastern Snake River Plain (ESRP) hydrologic province. The computer model was assimilated by the WGI using site specific data from a variety of sources including nearby well logs, operator records, and hydrogeologic reports. Although there are two drinking water wells associated with this system, the delineation in this assessment represents both wells based upon similarities in hydrogeologic characteristics. A summary of the hydrogeologic information from the WGI Source Area Delineation Report is provided below.

FIGURE 1 - Geographic Location of Pioneer Acres, PWS#: 6060056



The East Margin Area encompasses 821 square miles, representing approximately 8 percent of the total area of the ESRP hydrologic province. The majority of the East Margin Area is within Bingham County, with small areas occurring in Bannock, Bonneville, and Power counties.

The regional ESRP aquifer is the most significant aquifer in the East Margin Area and consists primarily of basalt of the Quaternary-aged Snake River Group. However, additional water-bearing units are used for water supply along the margin of the ESRP. In order of decreasing age, the most significant aquifers in the Michaud Flats area are bedded rhyolite (volcanic rock) of the Tertiary-aged Starlight Formation and Quaternary-aged pediment gravels formed by running water, basalt of the Big Hole Formation, and stream deposits of the Sunbeam Formation (see Jacobson, 1982, p. 7, and Corbett, et al., 1980, pp. 6-10). A few shallow domestic wells in the central Michaud Flats area also are completed in Michaud Gravel, which is the shallow water-table aquifer. The American Falls Lake Beds Formation (AFLB) confines the deeper aquifers and averages 80 feet in thickness in the central Michaud Flats area (Jacobson, 1984, p. 6). The AFLB pinches out in the eastern Michaud Flats area near the Portneuf River, effectively combining the shallow and deep stream deposits into a single water table aquifer (Bechtel, 1994, p. 2-2). Other aquifers in the East Margin Area include fractured quartzite that has been developed near Blackfoot, stream deposits near the cities of Firth and Basalt, and pediment gravels in the Gibson Terrace area near Tyhee and Chubbuck.

PWS wells in the East Margin Area of the ESRP province produce water from five different aquifers: the Regional Eastern Snake River Plain aquifer, three alluvial or stream deposited aquifers (Eastern Michaud Flats, Firth/Basalt, and Gibson Terrace/Pocatello Bench), and a quartzite aquifer near Blackfoot.

Regional Eastern Snake River Plain Aquifer

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary-aged basalt flows of the Snake River Group, which are between layers of rocks formed by sediment deposition along the margins (Garabedian, 1992, p. 5). Quaternary-aged basalts are estimated to be 100 to 1,500 feet thick, with the majority of the area in the range of 100 to 500 feet thick (Whitehead, 1992, Plate 3). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and stream-produced sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest, along with sedimentary rocks and metamorphic rocks (altered by heat and/or pressure) (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain.

However, some reaches are believed to be perched or separated from the main ground water by unsaturated rock, such as the Lewisville-to-Shelly reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood rivers, rivers entering from the north vanish into the basalts of the Snake River Plain aquifer that have a higher ability to transmit water.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gallons per minute (gpm) are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 feet^2/second to 56 feet^2/second ($1.0x10^4$ to $4.8x10^6$ feet^2/day; Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p.15).

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 feet/mile and average 12 feet/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. The estimated effective ratio of the rock's open space volume to its total volume range from 0.04 to more than 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p. 16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11) and locally from canal leakage. Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River canyon near Thousand Springs and near American Falls and Blackfoot (Garabedian, 1992, p. 17). To a lesser degree, discharge also occurs through pumping and underflow.

The East Margin Area is among the most transmissive regions of the regional aquifer, therefore it has a higher ability to transmit water. A transmissivity of 21 feet^2/second was used to represent the upper 200 feet of the regional aquifer in the East Margin Area in the three-dimensional U.S.Geological Survey (USGS) ground water flow model (Garabedian, 1992, Plate 6). The equivalent hydraulic conductivity or the rate at which water can move through permeable material is 9,072 feet/day. This value is consistent with the range of hydraulic conductivity, the rate water flows through a cross section, (9,500 to 11,708 feet/day) calculated using data from a constant-rate aquifer test conducted in 1981 (Jacobson, 1982, p. 23). This range was calculated by dividing the estimated transmissivity (228,000 to 281,000 feet^2/day) by the perforated interval of the observation well (24 feet). The geometric mean hydraulic conductivity based on analysis of specific capacity data from PWS wells (135 feet/day) is significantly lower. A published water table map of the Upper Snake River Basin (Idaho Department of Water Resources (IDWR), 1997, p. 9) indicates that the ground water flow direction in the ESRP aquifer in the East Margin Area is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Recharge from precipitation and surface water irrigation in the East Margin Area ranges from less than 10 to more than 20 inches per year (Garabedian, 1992, Plate 8). The low end of the range applies to the area near Blackfoot, while the high end applies to the area on the west side of American Falls Reservoir near Aberdeen.

Kjelstrom (1995, p. 13) reports an annual river loss of 280,000 acre-feet to the regional basalt aquifer for the 27.5-mile Lewisville-to-Shelley reach of the Snake River and 110,000 acre-feet for the 23.5-mile Shelley-to-Blackfoot reach. Annual river gains of 1,900,000 acre-feet for the 36.6-mile Blackfoot-to-Neeley reach are also estimated (Kjelstrom, 1995, p. 13). A seepage study conducted in the fall of 1980 on the Portneuf River showed a gain of about 560 $feet^3$/second (cfs) (405,691 acre-feet) for the 13-mile Pocatello-to-American Falls Reservoir reach (Jacobson, 1982, p. 16). The average flow in the Blackfoot River near the city of Blackfoot is low at Station #13068500 (5.2 cfs; USGS, 2001) compared to the flow in the Snake River near the city of Blackfoot at Station #13069500 (2,900 cfs; USGS, 2001).

The delineated source water assessment area for Pioneer Acres drinking water wells trends to the northeast, and is elongated and conical in shape. The delineation is approximately 28 miles in length with the narrowest area near the wellheads approximately 1000 feet wide. The widest area of the delineation to the north is approximately 9 miles (see Appendix A). The actual data used by WGI in determining the source water assessment delineation are available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply source.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during 2002. The first phase involved identifying and documenting potential contaminant sources within the Pioneer Acres source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add additional potential sources that exist within the delineated area. The enhanced inventory was done with the assistance of Rich Williams, and additional potential contaminant sources were incorporated into the assessment. A figure showing well locations, the delineated area, and potential contaminant sources are provided with the report (see Appendix A). Potential contaminant sources have been given a unique site number that references tabular information associated with the public water sources.

The potential contaminant sources identified within the delineated TOT zones include major transportation corridors (U.S. Route 26, the railroad), a major surface water source (People's Canal) and network of irrigation canals. Other possible contaminant sources were underground storage tank (UST) and leaking underground storage tank (LUST) sites. There were sites considered for listing under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resource Conservation Recovery Act (RCRA), the Superfund Amendments and Reauthorization Act (SARA), and the Toxic Release Inventory (TRI). Dairies are located within the delineation along with deep injection wells, landfills, a wastewater land application site, and mines/quarries. In addition, local businesses were included that have the potential to contaminate due to the nature or type of the business. A complete list of potential contaminant sources is provided with this assessment (see Appendix A).

Section 3. Susceptibility Analyses

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for a well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix B contains a susceptibility analysis worksheets for each well in the assessment. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the water producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface, and a water depth of more than 300 feet from the surface protect the ground water from contamination. Also, with all factors equal, water taken from a greater ground water depth will result in contaminant reduction through absorption and/or other dispersion mechanisms (Idaho Source Water Assessment Plan, 1999, p. E-59).

Hydrologic sensitivity was rated high for Well #1 and Well #2 (see Table 1). This is based upon regional moderate to well drained soil classifications as defined by the National Resource Conservation Service (NRCS). According to well log information, both of the vadose zone compositions for Well #1 and Well #2 are predominately sand and gravel. The static water level for both wells is approximately 30 feet below ground surface (bgs). Based upon the static water level data for the wells, the depth to first ground water is less than 300 feet from the surface. There is no 50-foot thick fine-grained zone present in the subsurface for the wells. When the wells were deepened in June of 1994, a cumulative ten-foot thickness of red chalk and clay was found above the producing zone.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current PWS construction standards are met.

The system construction scores were rated moderate for Well #1 and Well #2 (see Table 1). Well drilling information was available for both wells.

The IDWR *Well Construction Standards Rules (1993)* require all PWSs to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, whether the casing and annular space is within consolidated material or 18 feet below the surface, the thickness of the casing, etc. Pump tests for wells producing greater than 50 gpm require a minimum of a 6-hour test. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. For Pioneer Acres, both wells did not meet all the well construction standards for a PWS.

Both Well #1 and Well #2 are located outside of a 100-year floodplain. The wellheads and surface seals are not considered maintained and in acceptable condition because they lack proper well vents. Venting the well casing may prevent a vacuum from forming when the well is turned on and cause the casing to slough. The vent should be down-turned and 18-inches above the ground surface. The vent should also have a 24-mesh non-corrodible screen to prevent insects and animals from entering the well casing.

Well #1 was drilled in December 1976 and deepened in June 1994. The static water level is 30 feet bgs. The well annular seal is 20 feet deep and set into a sand and gravel layer, and the casing extends to gray basalt and cinders. Well #1 has a 8-inch diameter casing (+1 to 53 feet). A 6-inch diameter casing (23 to 165-feet) was added when the well was deepened. Both casings are 0.250-inch thick. The required thickness for both 6-inch and 8-inch diameter casings is 0.280-inches. A pump test was conducted for Well #1 when it was deepened. Well test data shows a discharge of 200 gpm with a pumping level of 180-feet bgs for a one hour period. Since the well is not screened, the highest water production interval is at the bottom of the casing (165-feet bgs), which is greater than 100 feet below the well's static water level. When water is drawn from deeper levels of the aquifer, it may provide a buffer from contaminants.

Well #2 was also drilled in December 1976 and deepened in June 1994. The static water level is 30 feet bgs. The well annular seal is 20-feet deep and set into a sand and gravel layer, and the casing extends to gray basalt and cinders. Well #2 has a 8-inch diameter casing (+1 to 54 feet). A 6-inch diameter casing (23 to 165-feet) was added when the well was deepened. Both casings are 0.250-inch thick. The required casing thickness for both a 6-inch and 8-inch diameter well is 0.280-inches. A pump test was conducted for Well #2 when it was deepened. Well test data shows a discharge of 200 gpm with a pumping level of 180-feet bgs for a one hour period. Since the well is not screened, the highest water production interval for Well #2 is at the bottom of the casing (165-feet bgs), which is greater than 100 feet below the well's static water level.

Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zone of water contribution is assessed to determine each well's susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The land use in this area is considered irrigated cropland.

In terms of potential contaminant sources and land use susceptibility, both wells rated high for IOCs, VOCs, SOCs, and moderate for microbial contaminants (see Table 1). Refer to Appendix A for a complete list of sources identified in the potential contaminant inventory.

Final Susceptibility Rating

A detection above a drinking water standard (MCL), any detection of a VOC, SOC, or a confirmed detection of bacteria, will automatically give a high susceptibility rating to the final ranking despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead, this will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year TOT zone (Zone 1B), and a large percentage of agricultural land contribute greatly to the overall ranking.

The final susceptibility rankings are: Well #1 and Well #2 are high for IOCs, VOCs, SOCs, and microbial contaminants. These ratings reflect the hydrologic sensitivity, system construction, and potential contaminants inventory and land use within the delineated source water assessment areas for the Pioneer Acres wells. Refer to Table 1 for the susceptibility analysis summary.

Table 1. Summary of Pioneer Acres Susceptibility Analysis.

Drinking Water Source	Susceptibility Scores[1]									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	H	H	H	M	M	H	H	H	H
Well #2	H	H	H	H	M	M	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

The IOCs (barium, cyanide, fluoride, mercury and nitrate) and RADs (gross alpha, gross beta) represent the main water chemistry recorded for the Pioneer Acres PWS. The reported concentrations of these chemicals were below the MCL for each chemical. All water chemistry tests for the Pioneer Acres wells have not detected VOCs and SOCs.

Although there have been no detections of arsenic in the Pioneer Acres water system, the system should note that the EPA lowered the arsenic MCL to 0.01 mg/L in October 2001, giving systems until 2006 to comply with the new standard.

Total coliform bacteria were detected at various locations within the distribution system. Since September 2000, no total coliform bacteria have been detected in the system.

In this area, the county level nitrogen fertilizer use, the herbicide use and overall agriculture-chemical use are all considered high. This is related to the amount of agricultural land in this area. Although there may only be a small portion of agriculture land may be in the direct vicinity of the wellheads, it is useful as a tool in determining the overall chemical usage such as pesticides, and how they may impact ground water through infiltration and surface water runoff. Potential contaminant sources were identified within the wells delineated capture zones and were documented (see Appendix A).

Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For drinking water protection, the Pioneer Acres need to properly maintain and protect the wellheads. Protection includes no application or storage of herbicides, pesticides or other chemicals within 50 feet from the wellhead. If microbial contamination becomes a concern, the system should take appropriate measures to disinfect the system. If nitrates or other IOC levels increase, the system should investigate remediation options such as reverse osmosis.

Once drinking water wells are protected, the system can focus on documenting types and locations of potential contaminant sources. These potential contaminant sources can be point sources, such as a new gas station, or non-point sources, such as storm water runoff. Any new sources that may be considered potential contaminants should be investigated and if need be monitored to prevent future contamination. Land uses within the area should also be evaluated. Areas with higher than normal agricultural land use may have increases in agricultural wastewater runoff that could infiltrate the ground water. Land uses within most of the source water assessment area are beyond the property boundaries of Pioneer Acres. Therefore partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating employees and the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bingham County Soil and Water Conversation District. As a major transportation corridor (i.e., U.S. Route 26) intersects the delineation, the Idaho Department of Transportation should be involved in protection efforts. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning ordinances) or non-regulatory (i.e. public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

Assistance

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

DEQ Pocatello Regional Office	(208) 236-6160
DEQ State Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper at (208) 343-7001 or email her at mlharper@idahoruralwater.com for assistance with drinking water protection (formerly wellhead protection) strategies.

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POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as a Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5 mg/L.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RCRA – Site regulated under **Resource Conservation Recovery Act**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Appendix A

Pioneer Acres
Delineation Map and Potential Contaminant Sources Table

Table 2. Pioneer Acres Well #1 and Well #2 Potential Contaminant Inventory.

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
	Railroad	0-3	GIS Map	IOC, VOC, SOC, Microbials
	U.S. Route 26	0-3	GIS Map	IOC, VOC, SOC, Microbials
	People's Canal	0-3	GIS Map	IOC, VOC, SOC, Microbials
1	LUST Site-Cleanup Incomplete; Impact	0-3	Database Inventory	VOC, SOC
2	UST Site-Gas Station; Closed	0-3	Database Inventory	VOC, SOC
3	UST Site-Gas Station; Open	0-3	Database Inventory	VOC, SOC
4	UST Site-Gas Station; Open	0-3	Database Inventory	VOC, SOC
5	Automobile Repairing & Service	0-3	Database Inventory	IOC, VOC, SOC
6	Trucking-Heavy Hauling	0-3	Database Inventory	VOC, SOC
7	Automobile Repairing & Service	0-3	Database Inventory	IOC, VOC, SOC
8	Automobile Repairing & Service	0-3	Database Inventory	IOC, VOC, SOC
9	CERCLA Site	0-3	Database Inventory	IOC, VOC, SOC
10	Mine/Quarry	0-3	Database Inventory	IOC, VOC, SOC
11	SARA Site	0-3	Database Inventory	IOC, VOC, SOC
12	Recharge Point	0-3	Database Inventory	IOC, VOC, SOC, Microbials
13	Wastewater Land Application Site	0-3	Database Inventory	IOC, Microbials
14	Landfill	0-3	Database Inventory	IOC, VOC, SOC, Microbials
15	Landfill	0-3	Database Inventory	IOC, VOC, SOC, Microbials
158	Gun range	0-3	Enhanced Inventory	IOC
159	Garbage Transfer Station	0-3	Enhanced Inventory	IOC, VOC, SOC, Microbials
16	CERCLA Site	3-6	Database Inventory	IOC, VOC, SOC
17	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
18	Recharge Point	3-6	Database Inventory	IOC, VOC, SOC
19	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
20	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
21	UST Site-Gas Station; Closed	6-10	Database Inventory	VOC, SOC
22	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
23	UST Site-Utilities; Closed	6-10	Database Inventory	VOC, SOC
24	UST Site-Not Listed; Closed	6-10	Database Inventory	VOC, SOC
25	UST Site-Local Government; Closed	6-10	Database Inventory	VOC, SOC
26	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
27	UST Site-Utilities; Closed	6-10	Database Inventory	VOC, SOC
28	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
29	UST Site-Commercial; Closed	6-10	Database Inventory	VOC, SOC
30	UST Site-Gas Station; Open	6-10	Database Inventory	VOC, SOC
31	UST Site-Truck/Transporter; Open	6-10	Database Inventory	VOC, SOC
32	Dairy	6-10	Database Inventory	IOC
33	Dairy	6-10	Database Inventory	IOC
34	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
35	Hydraulic Equipment-Repairing	6-10	Database Inventory	VOC, SOC
36	Veterinarians	6-10	Database Inventory	IOC, VOC
37	Concrete Contractors	6-10	Database Inventory	IOC, VOC, SOC
38	Boat Dealers	6-10	Database Inventory	VOC, SOC
39	Steel Fabricators	6-10	Database Inventory	IOC, VOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
40	Oils-Fuel (Wholesale)	6-10	Database Inventory	VOC, SOC
41	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
42	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
43	Concrete Contractors	6-10	Database Inventory	IOC, VOC, SOC
44	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
45	Controls Systems/Regulators	6-10	Database Inventory	IOC, VOC, SOC
46	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
47	Gazebos	6-10	Database Inventory	IOC, VOC
48	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
49	Painters	6-10	Database Inventory	VOC
50	Oils-Fuel (Wholesale)	6-10	Database Inventory	VOC, SOC
51	Service Industry Machinery (Manufacturers)	6-10	Database Inventory	VOC, SOC
52	Painters	6-10	Database Inventory	VOC
53	Boat Dealers	6-10	Database Inventory	VOC, SOC
54	Automobile Customizing	6-10	Database Inventory	IOC, VOC, SOC
55	Snowmobiles	6-10	Database Inventory	VOC, SOC
56	General Contractors	6-10	Database Inventory	IOC, VOC, SOC
57	Gas Companies	6-10	Database Inventory	VOC, SOC
58	Demolition Contractors	6-10	Database Inventory	IOC, VOC, SOC
59	Storage-Household & Commercial	6-10	Database Inventory	IOC, VOC, SOC
60	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
61	Truck-Repairing & Service	6-10	Database Inventory	IOC, VOC, SOC
62	Movers	6-10	Database Inventory	VOC, SOC
63	Wrecker Service	6-10	Database Inventory	IOC, VOC, SOC
64	Veterinarians	6-10	Database Inventory	IOC, VOC
65	Painters	6-10	Database Inventory	VOC
66	Trailers-Horse (Wholesale)	6-10	Database Inventory	VOC, SOC
67	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
68	X-Ray Laboratories-Industrial	6-10	Database Inventory	IOC, VOC, SOC
69	Photographers-Portrait	6-10	Database Inventory	VOC
70	Electric Equipment & Supplies-Wholesale	6-10	Database Inventory	IOC, VOC
71	Automobile Renting & Leasing	6-10	Database Inventory	VOC, SOC
72	Laboratories-Testing	6-10	Database Inventory	IOC, VOC, SOC
73	Dairies	6-10	Database Inventory	IOC
74	Hardware-Retail	6-10	Database Inventory	IOC, VOC, SOC
75	Plumbing Drain & Sewer Cleaning	6-10	Database Inventory	IOC, VOC
76	Veterinarians	6-10	Database Inventory	IOC, VOC
77	Car Washing & Polishing	6-10	Database Inventory	IOC, VOC, SOC
78	Automobile Dealers-Used Cars	6-10	Database Inventory	VOC, SOC
79	Cleaners	6-10	Database Inventory	VOC
80	Landscape Contractors	6-10	Database Inventory	IOC, VOC, SOC
81	Tree Service	6-10	Database Inventory	VOC, SOC
82	Recycling Centers (Wholesale)	6-10	Database Inventory	IOC, VOC, SOC
83	Pile Driving Equipment (Manufacturers)	6-10	Database Inventory	VOC, SOC
84	Excavating Contractors	6-10	Database Inventory	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years) [2]	Source Information	Potential Contaminants[3]
85	Well Drilling	6-10	Database Inventory	IOC, VOC, SOC
86	Machine Shops	6-10	Database Inventory	IOC, VOC, SOC
87	Recycling Centers (Wholesale)	6-10	Database Inventory	IOC, VOC, SOC
88	Trucking-Heavy Hauling	6-10	Database Inventory	VOC, SOC
89	Truck Stops	6-10	Database Inventory	VOC, SOC
90	Limousine Service	6-10	Database Inventory	VOC, SOC
91	Toxic Release Inventory	6-10	Database Inventory	VOC, SOC
92	RCRA Site	6-10	Database Inventory	IOC, VOC, SOC
93	RCRA Site	6-10	Database Inventory	VOC, SOC
94	RCRA Site	6-10	Database Inventory	IOC, VOC, SOC
95	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
96	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
97	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
98	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
99	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
100	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
101	Mine/Quarry	6-10	Database Inventory	IOC, VOC, SOC
102	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
103	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
104	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
105	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
106	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
107	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
108	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
109	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
110	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
111	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
112	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
113	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
114	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
115	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
116	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
117	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
118	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
119	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
120	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
121	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
122	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
123	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
124	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
125	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
126	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
127	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
128	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
129	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC

Site #	Source Description[1]	TOT Zone (in years)[2]	Source Information	Potential Contaminants[3]
130	Deep Injection Well	6-10	Database Inventory	IOC, VOC, SOC
131	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
132	SARA Site	6-10	Database Inventory	VOC, SOC
133	SARA Site	6-10	Database Inventory	VOC, SOC
134	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
135	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
136	SARA Site	6-10	Database Inventory	IOC, VOC, SOC
137	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
138	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
139	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
140	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
141	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
142	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
143	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
144	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
145	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
146	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
147	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
148	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
149	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
150	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
151	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
152	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
153	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
154	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
155	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
156	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC
157	Recharge Point	6-10	Database Inventory	IOC, VOC, SOC

[1] LUST = Leaking underground storage tank , UST = Underground storage tank, CERCLA = Comprehensive Environmental Response Compensation and Liability Act, SARA = Superfund Amendments and Reauthorization Act , RCRA = Resource Conservation Recovery Act
[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead
[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix B

Pioneer Acres
Susceptibility Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.2**)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x **0.375**)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : PIONEER ACRES Well# : WELL 1
Public Water System Number 6060056 10/23/02 12:12:33 PM

1. System Construction

		SCORE
Drill Date	12/6/76 deepended 6/7/94	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A

		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2

Potential Contaminant / Land Use - ZONE 1B

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant sources present (Number of Sources)	YES	15	18	18	8
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	16	11	9	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		16	16	18	12

Potential Contaminant / Land Use - ZONE II

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
Potential Contaminant Source / Land Use Score - Zone II		4	4	4	0

Potential Contaminant / Land Use - ZONE III

		IOC Score	VOC Score	SOC Score	Microbial Score
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0

	IOC Score	VOC Score	SOC Score	Microbial Score
Cumulative Potential Contaminant / Land Use Score	27	25	29	14
4. Final Susceptibility Source Score	15	15	16	15
5. Final Well Ranking	High	High	High	High

Ground Water Susceptibility Report   Public Water System Name : PIONEER ACRES   Well# : WELL 2

Public Water System Number 6060056   10/23/02 12:12:33 PM

1. System Construction		SCORE
Drill Date	12/7/76 deepended 6/7/94	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	2000
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	NO	1
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
	Total Hydrologic Score	6

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
	Total Potential Contaminant Source/Land Use Score - Zone 1A	4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	15	18	18	8
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	16	11	9	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	2	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
	Total Potential Contaminant Source / Land Use Score - Zone 1B	16	16	18	12
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	25 to 50% Irrigated Agricultural Land	1	1	1	
	Potential Contaminant Source / Land Use Score - Zone II	4	4	4	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
	Total Potential Contaminant Source / Land Use Score - Zone III	3	3	3	0
Cumulative Potential Contaminant / Land Use Score		27	25	29	14
4. Final Susceptibility Source Score		15	15	16	15
5. Final Well Ranking		High	High	High	High